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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,816	02/25/2005	Takafumi Shichida	Q86555	1157

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EXAMINER
BALL, JOHN C

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,816	SHICHIDA ET AL.	
	Examiner	Art Unit	
	J. CHRISTOPHER BALL	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4 and 7-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4 and 7-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/25/2005;06/01/2005;03/13/2008;06/25/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the initial Office Action based on the National Stage of the SHICHIDA et al. application filed as a PCT application on August 27, 2003.

2. Claims 1, 3, 4, and 7-13 are currently pending and have been fully considered.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "**40**" has been used to designate two different elements in Figure 5C. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required

corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference character "**44**" does not appear in the specification but is use to designate an element in Figure 5C; and reference character "**26**" does not appear in the specification but is used to designated an element in Figure 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 3, 4, and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over a machine translation to English of GRIESER et al. (Japanese Patent Publication 2002-236105) in view of a machine translation to English of MANKINO et al. (Japanese Patent Publication 2001-099807).

Regarding claim 1, GRIESER et al. discloses a gas measuring sensor, wherein is taught a gas sensing element extending in an axial direction, and having a gas contact part, which is brought into contact with a gas to be measured, at its front end (21, Drawing 1);

a case that surrounds the gas sensing element in a radial direction in such a manner that the gas contact part protrudes from a front end of the case (26, Drawing 1); and,

a protector, formed into a bottomed cylinder, fixed to the case in such a manner that the protector covers the gas contact part of the gas sensing element (25, Drawing 1), wherein the protector is composed of an inner hollow-cylindrical portion, and an outer hollow-cylindrical portion which is provided coaxially with a side wall of the inner hollow-cylindrical portion with an air space in between (28, Drawing 1),

the inner hollow-cylindrical portion is formed into a bottomed cylinder, the outer hollow-cylindrical portion is formed into a bottomed cylinder, the inner hollow-cylindrical portion is passed through an insertion hole provided in a bottom wall of the outer hollow-cylindrical portion, so that the bottom wall of the inner hollow-cylindrical portion protrudes nearer to the front end than the bottom wall of the outer hollow-cylindrical portion, the bottom wall of this inner hollow-cylindrical portion being made a bottom wall positioned at an utmost front end of the protector (Drawing 1),

a plural number of outer-wall gas inlet openings are formed in a side wall of the outer hollow-cylindrical portion (29 in outer wall, Drawing 1),

plural number of inner-wall gas inlet openings are formed in the side wall of the inner hollow-cylindrical portion, the inner-wall gas inlet openings being arranged nearer to the case than the outer-wall gas inlet openings so that the

gas to be measured is introduced around the gas contact part, and, an outer circumferential face of the side wall of the inner hollow-cylindrical portion positioned opposite to the outer-wall gas inlet openings is formed so as to be parallel to an outer circumferential face of the side wall of the outer hollow-cylindrical portion (29 in inner wall, Drawing 1), and

a discharge opening for discharging the gas to be measured, which is introduced to inside of the inner hollow-cylindrical portion directly to outside of the protector, is formed in the bottom wall positioned at the utmost front end of the protector (29 at bottom of cylinder, Drawing 1).

GRIESER et al. does not teach the plural number of outer-wall gas inlet openings having guiding bodies extending inward so that the gas to be measured is introduced to the air space.

However, MAKINO et al. discloses a gas sensor, wherein is taught guiding bodies extending inward from a plural number of outer-wall gas inlet openings (P1, Drawing 5a).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to include the guiding bodies as taught by MAKINO et al. in the sensor as taught by GRIESER et al. because the guiding bodies function to generate a circular glow of gas to separate gas from any liquid droplets (MANKINO et al., Abstract).

Regarding claim 3, GRIESER et al. teaches the side wall of the inner hollow-cylindrical portion, which protrudes nearer to the front end than the bottom wall of the outer hollow-cylindrical portion, has a taper part so that an outer diameter of the side wall becomes smaller toward the front end (Drawing 1), and a protruding length of the inner hollow-cylindrical portion which protrudes from the bottom wall of the outer hollow-cylindrical portion and has the taper part is about 1 mm, as it is comparable to the width of a ring groove (41, Drawing 1), which is recited as being 1 mm in width (paragraph [0015]).

Regarding claim 4, GRIESER et al. teaches the side wall of the inner hollow-cylindrical portion, which protrudes nearer to the front end than the bottom wall of the outer hollow-cylindrical portion, has a taper part so that an outer diameter of the side wall becomes smaller toward the front end, and the bottom wall of the outer hollow-cylindrical portion has a taper part so that that an outer diameter of the bottom wall becomes smaller toward the front end (Drawing 1).

Regarding claim 7, GRIESER et al. teaches the limitations of claim 1 as outlined above.

GRIESER et al. does not teach at least one drain hole is formed in a part, in the bottom wall of the outer hollow-cylindrical portion, which is positioned nearer to outside in a radial direction than the outer circumferential face of the side wall of the inner hollow-cylindrical portion.

However, MANKINO et al. teach a drain hole in the bottom wall of the outer hollow-cylindrical portion, termed a second side gas outlet (paragraph [0031]).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to incorporate the drain hole as taught by MANKINO et al. in the bottom wall of the outer hollow-cylindrical portion, which is positioned nearer to outside in a radial direction than the outer circumferential face of the side wall of the inner hollow-cylindrical portion of the device disclosed by GRIESER et al. because it would allow any water or oil to drain away and not interfere with the function of the gas sensor element (MANKINO et al., paragraph [0031]).

Regarding claim 8, GRIESER et al. teaches the limitations of claim 1 as outlined above.

GRIESER et al. does not teach a drain hole is formed in a region of the side wall of the inner hollow-cylindrical portion which is positioned inside of the outer hollow-cylindrical portion, and the drain hole is formed in such a manner that a front side edge, of an inner periphery of the drain hole, which is positioned at the front end in the axial direction of the protector is positioned nearer to the front end in the axial direction of the protector than a rear side edge, of an inner periphery of the outer-wall gas inlet opening positioned at an utmost front end of

the side wall of the outer hollow-cylindrical portion, which is positioned at a rear end in the axial direction of the protector.

However, MANKINO et al. teaches a drain hole is formed in a region of the side wall of the inner hollow-cylindrical portion which is positioned inside of the outer hollow-cylindrical portion (62, Drawing 1), and the drain hole is formed in such a manner that a front side edge, of an inner periphery of the drain hole, which is positioned at the front end in the axial direction of the protector is positioned nearer to the front end in the axial direction of the protector than a rear side edge (Drawing 1), of an inner periphery of the outer-wall gas inlet opening (63, Drawing 1) positioned at an utmost front end of the side wall of the outer hollow-cylindrical portion, which is positioned at a rear end in the axial direction of the protector (Drawing 1).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to combine the drain hole as taught by MANKINO et al. with the gas sensor as taught by GRIESER et al. because water and other sensor poisons can be dealt with by the drain hole, sparing the sensing detection element (MANKINO et al., paragraph [0033]).

Regarding claims 9 and 10, GRIESER et al. teaches the limitations of claim 1, and in combination with MANKINO et al., the limitations of claim 8 as outlined above.

GRIESER et al. does not teach a second guiding body, one end of which is connected to the rear side edge of the inner periphery of the drain hole and the other end of which extends with an inclination so as to come close to a center, in a radial direction, of the protector from the rear side edge of the drain hole toward the front end of the protector, or a notch crossing to the axis of the protector is provided in a part of the side wall of the inner hollow-cylindrical portion, and a region at the rear end in the axial direction of the protector from this notch is stuck out inward in the radial direction in such a manner as to continue to the side wall of the inner hollow-cylindrical portion, thereby, forming the second guiding body extending in the axial direction of the protector and the drain hole.

However, MANKINO et al. teaches a second guiding body (S′ and L′, Drawing 3c), one end of which is connected to the rear side edge of the inner periphery of the drain hole and the other end of which extends with an inclination so as to come close to a center, in a radial direction, of the protector from the rear side edge of the drain hole toward the front end of the protector (Drawing 3a and 3c). These guides are formed by notches crossing to the axis of the protector in the side wall of the inner hollow-cylindrical portion (Drawing 3c).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to incorporate the second guiding body as taught by MANKINO et al. into the gas sensor taught by GRIESER et al. because the flaps of the second guide body helps prevent water and oil from getting to the sensor element (paragraph [0039]).

Regarding claim 11, GRIESER et al. teaches the limitations of claim 1, and in combination with MANKINO et al., the limitations of claim 8 as outlined above, including a drain hole in the inner hollow-cylindrical portion and a plurality of inner-wall gas inlet openings (GRIESER et al., 29, Drawing 1).

GRIESER et al. and MANKINO et al. do not explicitly teach a plurality of drain holes or that the total opening area of the drain holes is smaller than the total opening area of the plurality of inner wall gas inlet openings.

However, at the time of the present invention, it would have been obvious to one of ordinary skill in the art to include more than one drain hole because it gives the added advantage of ridding the sensor of potential sensor element poisons more efficiently, and a skilled artisan would also realize that it would be common in the art to keep the total opening area of the drain holes lower than the total opening area of the inner-wall gas inlet openings to retain as much gas sample in the vicinity of the sensor element to keep the measurements as accurate as possible.

Regarding claim 12, GRIESER et al. teaches the limitations of claim 1 as outlined above.

GRIESER et al. does not teach any limitations regarding a guiding body.

However, MANKINO et al. teaches an angle of the guiding bodies extending from end parts of the outer-wall gas inlet openings is formed inward in

a range from 35° to 70°, relative to a tangent line of an outer circumference of the outer hollow-cylindrical portion (Drawing 4).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to include the guiding bodies as taught by MAKINO et al. in the sensor as taught by GRIESER et al. because the guiding bodies function to generate a circular glow of gas to separate gas from any liquid droplets (MANKINO et al., Abstract).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over a machine translation to English of KOJIMA (Japanese Patent Publication 2001-343356) in view of a machine translation to English of MANKINO et al. (Japanese Patent Publication 2001-099807), and in view of a machine translation to English of YASUDA (Japanese Patent Publication H10-111265).

KOJIMA discloses a gas sensor, wherein it is taught comprising an element extending in an axial direction, and having a gas contact part, which is brought into contact with a gas to be measured, at its front end (15, Drawing 1); a case that surrounds the gas sensing element in a radial direction in such a manner that the gas contact part protrudes from a front end of the case (10, Drawing 1); and a protector, formed into a bottomed cylinder, fixed to the case in such a manner that the protector covers the gas contact part of the gas sensing element (13, Drawing 1), wherein the protector is composed of an inner hollow-

cylindrical portion (132, Drawing 1), and an outer hollow-cylindrical portion which is provided coaxially with a side wall of the inner hollow-cylindrical portion with an air space in between (131, Drawing 1), the outer hollow-cylindrical portion is formed into a bottomed cylinder, and a bottom wall of the outer hollow-cylindrical portion is disposed nearer to the front end than the inner hollow-cylindrical portion, so that the bottom wall of the outer hollow-cylindrical portion is made a bottom wall positioned at an utmost front end of the protector (Drawing 1); plural number of inner-wall gas inlet openings are formed in the side wall of the inner hollow-cylindrical portion, the inner-wall gas inlet openings being arranged nearer to the case than the outer-wall gas inlet openings so that the gas to be measured is introduced around the gas contact part (130, Drawing 1), and, an outer circumferential face of the side wall of the inner hollow-cylindrical portion positioned opposite to the outer-wall gas inlet openings is formed so as to be parallel to an outer circumferential face of the side wall of the outer hollow-cylindrical portion (Drawing 1); and a discharge opening for discharging the gas to be measured, which is introduced to inside of the inner hollow-cylindrical portion directly to outside of the protector, is formed in the bottom wall positioned at the utmost front end of the protector (unlabeled opening in bottom wall, Drawing 1).

KOJIMA does not teach the plural number of outer-wall gas inlet openings having guiding bodies extending inward so that the gas to be measured is introduced to the air space.

However, MAKINO et al. discloses a gas sensor, wherein is taught guiding bodies extending inward from a plural number of outer-wall gas inlet openings (P1, Drawing 5a).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to include the guiding bodies as taught by MAKINO et al. in the sensor as taught by KOJIMA because the guiding bodies function to generate a circular glow of gas to separate gas from any liquid droplets (MANKINO et al., Abstract).

KOJIMA does not teach that the bottom wall of the outer hollow-cylindrical portion is composed of a first bottom wall which is connected to the side wall of the outer hollow-cylindrical portion, and a second bottom wall disposed nearer to the front end than the first bottom wall, the discharge opening being formed in the second bottom wall, and a connecting side wall that connects the first bottom wall and the second bottom wall has a taper part so that an outer diameter of the connecting side wall becomes smaller toward the front end.

However, YASUDA discloses an exhaust gas sensor, wherein is taught the bottom wall of the outer hollow-cylindrical portion is composed of a first bottom wall (6, Drawing 1) which is connected to the side wall of the outer hollow-cylindrical portion (4, Drawing 1), and a second bottom wall disposed nearer to the front end than the first bottom wall (below 12, Drawing 1), the discharge opening being formed in the second bottom wall (12, Drawing 1), and a connecting side wall that connects the first bottom wall and the second bottom

wall has a taper part (Abstract) so that an outer diameter of the connecting side wall becomes smaller toward the front end (Drawing 1).

At the time of the present invention, it would have been obvious to incorporate the outer wall configuration as taught by YASUDA into the gas sensor taught by KOJIMA because the design ushers water from a combustion reaction away from the gas sensing element (YASUDA, paragraph [0011]).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. CHRISTOPHER BALL, Ph.D. whose telephone number is (571)270-5119. The examiner can normally be reached on Monday through Thursday, 8:00 am to 5:00 pm (EDT).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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